ARINC ACARS Messenger ®

NASA I-CNS Conference

May 21, 2003

ARINC
YOU WON'T BELIEVE WHAT WE CAN DO.™

Topics

- Low Cost ACARS – ***The Evolution***
- The EFB As A User Interface
- EFB Synergy

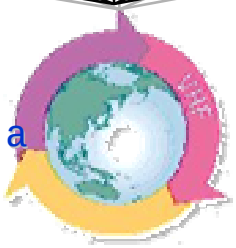
ACARS ®

Aircraft Communications And Reporting System

(ACARS is a registered trademark of ARINC Incorporated)

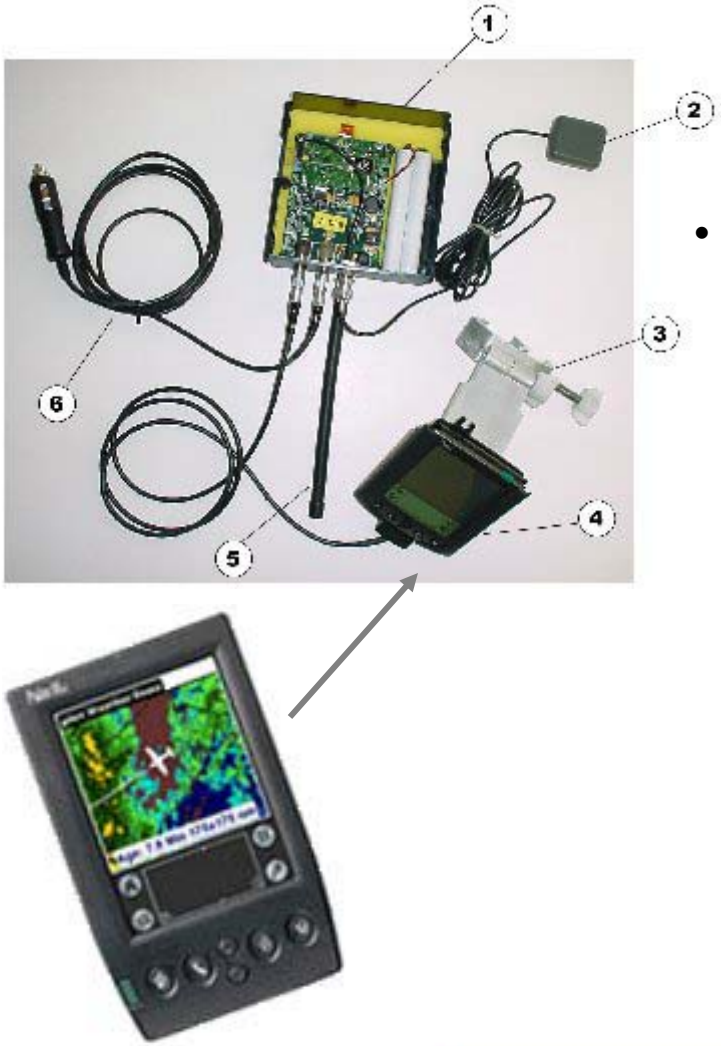
Applications & Possibilities

Maintenance	*Operations*	*Cockpit*	*ATC*	*Security*
Aircraft Performance Diagnostics Live Maintenance Electronic Log Book Maintenance Docs FOQA - QAR	Weight & Balance Weather Flight Following Flight Planner Flight Scheduling	Weather D-ATIS TWIP GTWS	**PDC** Position Reports* ATC Messaging*	Flight Following - Panic Emergency MSG Ground / Physical Security Airborne Video - Snaps



* Potential Future

What Is FlyTimer



- Economical, innovative and portable aircraft electronics system to provide wireless data transmission between the ground and aircraft over the ARINC ACARS network.
- Core technology:

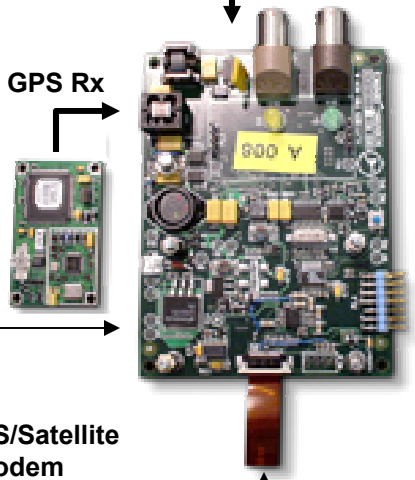
1) WxMate transceiver with cover removed
2) GPS active antenna
3) Yoke mount
4) PDA-type display
5) Portable VHF antenna on prototype (permanent antenna required on the exterior of the aircraft)
6) Power supply connection

The Avionics

User Interface

GPS Rx

12 Sensor Ports



ACARS/Satellite Modem & Control

Run High Level Applications
Sense, build, send OOOI messages
Format Messages, attach Labels
Decode Message Labels, display text

Control & Display Unit (CDU) ARINC 620

CDU/Modem Interface

SAATs Application
Security & Monitoring Applications
Build Message Blocks
- Add headers, control chars, build CRC
- ASCII ->ISO-5 coding

Decode Message Blocks
- Run CRC, Strip headers, control chars
- ISO-5 -> ASCII decoding

Build, transmit Multiblock D/L messages
Decode and reassemble Multiblock U/L messages
Maintain Data Link
- Frequency Management
- ACKs, NAKs, Retransmissions, Timers
- No Comms handling
- CSMA algorithm

MSK Modulation
- PreKey

MSK Demodulation
- Synchronization
- Deal with Co-channel interference

ACARS Control Unit (ACU) & GPS ARINC 618

Modem/Transceiver Interface

Tune Frequency
Transmit – 5 Watts
Receive - -20 dB to –100dB

VHF Transceiver

Security Messenger ®

Operational Demonstration FAA: November 5, 2001

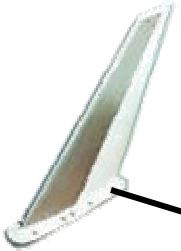
- ***GPS***
- ***VHF Radio***
- ***ACARS Processor***
- ***15 Hours of Power***
- ***Security Sensors***

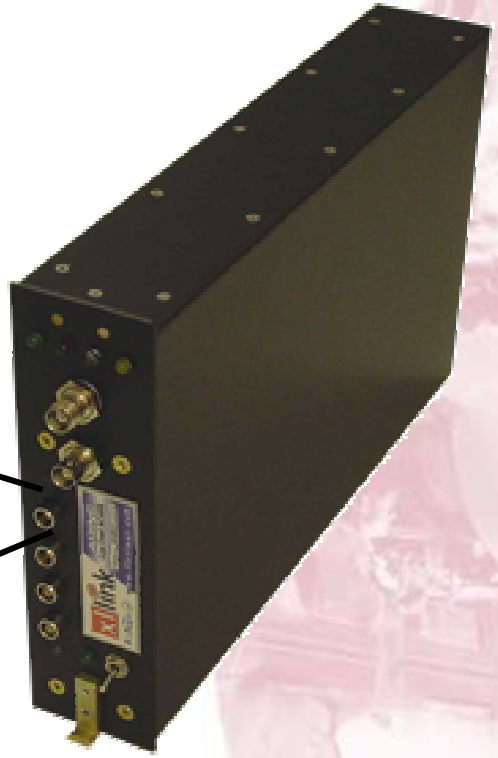
Model “C” - xllink

- AQP Tested Last December
- 12 Sensor Inputs
- Ethernet Connectivity
- Software on EFB
- 72 Hour Power supply connection

System Components

VHF Air - Ground
& GPS Antenna





VHF / GPS / ACARS Communications Unit

ACARS Software for
Electronic Flight
Bags, MFD & Laptops

- ***ACARS Messages***
- ***W&B***
- ***Document Browser***
- ***Video Display***

Electronic Flight Bag

Weight & Balance

Document Browser

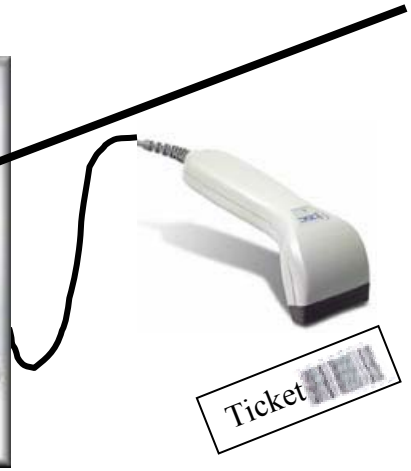
ACARS Messaging

- Integrated software for ACARS Messaging
- Enhanced interface providing efficient chart access using Jeppesen, LIDO, or other chart supplier
- A document browser
- Weight & Balance
- Airborne Video

Airborne Video Surveillance

EFB Integrated W&B

Touch Screen EFB



RS232

Digital Portable Scale

- EFB Weight & Balance Software
- Scan each passenger ticket (seat #)
- Obtains weight from digital scale
- Dynamically populates W&B load plan
- Used for Cargo and Baggage

Patent Pending

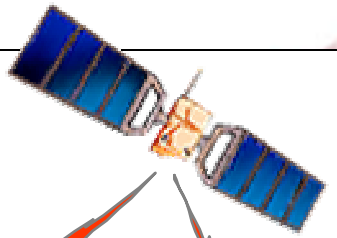
Datalink Functionality

- Airborne Capabilities
  - Weather Requests (ATIS, TAF, METAR …)
  - Text Messages
  - PDC Requests
  - Position Reports, Estimates, Delays …
  - Special / Emergency Conditions
- Automated Messages
  - OOOI (Out, Off, On, In)
  - Security Intrusions
- Ground Based Capabilities
  - Graphic Display Of Aircraft Position
  - Web Based Messaging
  - ARINC 24/7 Network Monitoring & Backup
  - ARINC 24/7 Security Monitoring
- Potential
  - Moving map – situational awareness
  - Upgrade to VDLM2 & Iridium
  - Engine Condition Monitoring (Interface Options)
  - Graphic Weather Info.

System Components

Onboard Equipment	***Product***
• AMU, GPS & Transceiver	FlyTimer
• Cockpit Display Units	Electronic Flight Bags
Communications Infrastructure	
• Air / Ground Datalink	GlobaLink
• Air / Ground Voice	Air Ground Domestic
• Ground / Ground	AViNet
• 24/7 Support & Security Monitoring	ARINC NOC, ARINC Direct
Situational & Communications Tools	
• Messaging Application	OpCenter / ARINC Direct
• Situational Display	WebASD

Enterprise Solution



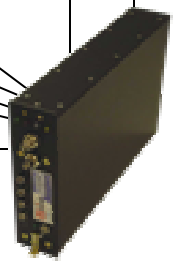
VHF or Satellite

Satellite Gateway

OOOI & Security Sensor Input

VHF & GPS Antenna

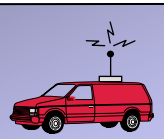
SATCOM Antenna



VHF, SATCOM, GPS & AMU

EFB or MFD

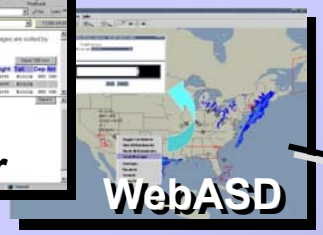
Ground Applications



Security Monitor

AviNet™

GLOBALink Ground Infrastructure



Summary

- Low Cost ACARS Capability Using EFB or MFD & FlyTimer.
- Accepts inputs (sensors) and communicates messages to appropriate ground locations (in near real time).
- Utilizes existing infrastructures and commercial products for communications, distribution and situation awareness.
- Available for delivery – Q4, 2003
- Can easily be added to most Electronic Flight Bags.
- Integrated Functionality – Browser, W&B and Video

Operational Demonstration FAA: November 5, 2001
NASA Demonstration: January 31, 2002
Passed AQP: December 2002